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Chemistry Paper 2

Topic C6 – The rate and extent of chemical change
Topic C7 – Organic Chemistry
Topic C8 – Chemical Analysis
Topic C9 – Chemistry of the atmosphere
Topic C10 – Using Resources

Watch all the videos for free at www.gcserevisionmonkey.com

Topic 6 – The rate and extent of chemical change

Topic 6 will be examined in AQA Chemistry Paper 2

1. Rates of Reaction
2. Measuring Rates of Reaction
3. Rate of Reaction Graphs
4. Reversible Reactions
5. Le Chatelier's Principle (Higher Tier Only)

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Rates of Reaction

For AQA Combined and Separate Science

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Collision Theory:

Minimum amount of energy needed for a reaction to happen

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Factors affecting the rate of reaction:

- Concentration
  - Increases the frequency of collisions.
  - Increase the rate of reaction.
- Pressure
- Surface area
- Temperature
  - Increases the frequency of collisions.
  - Increase the rate of reaction.
  - Particles move faster
  - More energetic collisions
  - More particles have the activation energy

AQA Combined and Separate Chemistry– Topic 6: The rate and extent of chemical change **(Paper 2)**

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Catalysts

- Increase rate of reaction
- By providing an alternative pathway with a lower activation energy.

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Measuring Rates of Reaction

For AQA Combined and Separate Science

Watch all the videos for free at www.gcserevisionmonkey.com

$$Rate\ of\ Reaction = \frac{amount\ of\ reactant\ used}{time}$$

$$Rate\ of\ Reaction = \frac{amount\ of\ product\ made}{time}$$

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Required Practical 1:

How does concentration affect rate of reaction?

Record mass at regular intervals (e.g. every 30 seconds).

Change concentration of acid (0.1 M, 0.5 M, 1 M).

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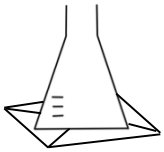
Required Practical 2:



How does concentration affect rate of reaction?

Time how long it takes for cross to disappear.

Change concentration of acid (0.1 M, 0.5 M, 1 M).

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Rate of Reaction Graphs

For AQA Combined and Separate Science

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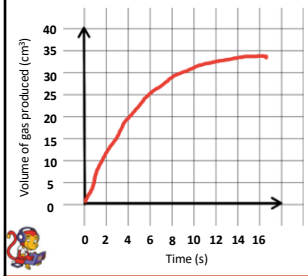

What is the mean rate of reaction?

What is the mean rate of reaction between 4 and 12 seconds?

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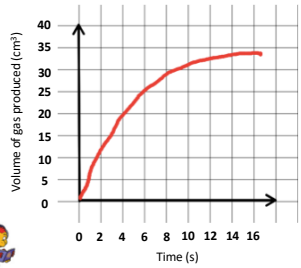
What is the rate of reaction at 8 seconds?



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Reversible Reactions

For AQA Combined and Separate Science

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Hydrated copper sulfate ⇌ anhydrous copper sulfate + water

Forward and backward reactions happen at the same rate

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Le Chatelier's Principle (Higher Tier only)

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$N_2 + 3H_2 \rightleftharpoons 2NH_3$

Le Chatelier's Principle

When conditions of a reversible reaction change at equilibrium, the system will respond to counteract that change.

Concentration

Temperature

Pressure

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Topic 7 – Organic Chemistry

Topic 7 will be examined in AQA Chemistry Paper 2

1. Hydrocarbons
2. Fractional Distillation
3. Cracking

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Hydrocarbons

For AQA Combined and Separate Science

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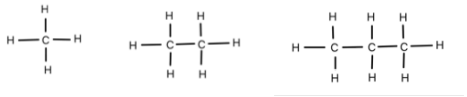

AQA Combined and Separate Chemistry– Topic 7: Organic Chemistry **(Paper 2)**

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Combustion

methane + oxygen → carbon dioxide + water

ethane + oxygen →

propane + oxygen →

butane + oxygen →

AQA Combined and Separate Chemistry– Topic 7: Organic Chemistry **(Paper 2)**

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Fractional Distillation

For AQA Combined and Separate Science

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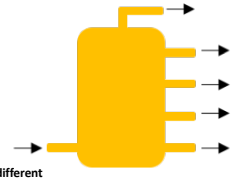

Mixture of different lengths of hydrocarbons

Products can be used as…

Feedstock for other chemicals…

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Cracking

For AQA Combined and Separate Science

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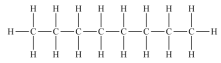

Steam

Catalytic

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Topic 8 – Chemical Analysis

Topic 8 will be examined in AQA Chemistry Paper 2

1. Purity and Formulations
2. Chromatography (RP)
3. Testing for gases

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Purity and Formulations

For AQA Combined and Separate Science

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Only contains one element or compound

Useful mixtures made from a recipe for a specific purpose

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Element	Melting point (°C)	Boiling point (°C)
Copper	1083	2567
Magnesium	650	1107
Oxygen	-218.4	-183
Carbon	3500	4827
Helium	-272	-268.6
Sulphur	112.8	444.6

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Chromatography (RP)

For AQA Combined and Separate Science

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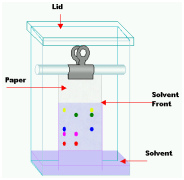

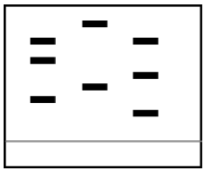

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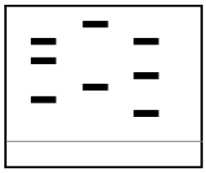

$$R_f = \frac{distance\ travelled\ by\ substance}{distance\ travelled\ by\ solvent}$$

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Testing for Gases

For AQA Combined and Separate Science

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Hydrogen

Oxygen

Carbon dioxide

Chlorine

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Topic 9 – Chemistry of the Atmosphere

Topic 9 will be examined in AQA Chemistry Paper 2

1. Evolution of the atmosphere
2. Greenhouse gases and climate change
3. Carbon footprints
4. Air pollution

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Evolution of the atmosphere

For AQA Combined and Separate Science

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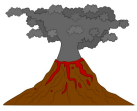
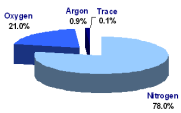
4.6 billion years ago — Now



Atmospheric Composition



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Greenhouse Gases and Climate Change

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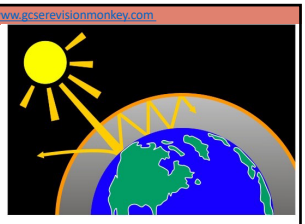
Greenhouse Effect



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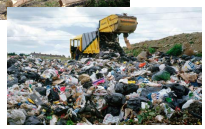
Global Warming - causes



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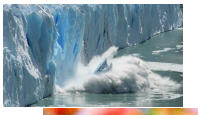
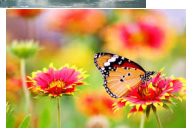
Global Warming - consequences





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Carbon Footprints

For AQA Combined and Separate Science

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Carbon footprint: The amount of CO_2 and other greenhouse gases released over the full lifecycle of a product.

Ways to reduce carbon footprint:

Difficulties:

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Air Pollution

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Solid Particulates –

Carbon Monoxide –

Sulfur dioxide -

Nitrogen oxides -

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Topic 10 – Using Resources

Topic 10 will be examined in AQA Chemistry Paper 2

1. Resources and Recycling
2. Phytomining and Bioleaching (Higher Tier)
3. Life cycle assessments
4. Potable Water
5. Distillation (RP)
6. Waste water treatment

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Resources and Recycling

For AQA Combined and Separate Science

AQA Combined and Separate Chemistry – Topic 10: Using Resources **(Paper 2)**

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Reform at a similar rate or faster than we use them

Aren't formed quickly enough to be considered replaceable.

Development that meets the needs of present society without damaging future generations.

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Recycling

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Phytomining and Bioleaching (Higher Tier)

For AQA Combined and Separate Science

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Phytomining

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Bioleaching

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Life Cycle Assessments

For AQA Combined and Separate Science

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LCA – assessing environmental impacts of products

Plastic bags	Paper bags

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Potable Water

For AQA Combined and Separate Science

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Potable Water → water that is safe to drink

Water source

Filtration

Sterilisation

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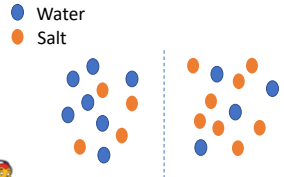
Desalination

Reverse Osmosis

Distillation



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Distillation (RP)

For AQA Combined and Separate Science

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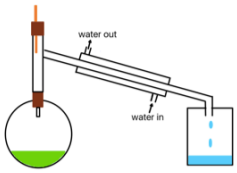

- Test pH using pH meter
- Neutralise it
- Distill it
- Re-test the pH at the end.

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Waste Water Treatment

For AQA Combined and Separate Science

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Screening

↓

Sedimentation

↓

Anaerobic digestion

→ Aerobic digestion